## **AMENDMENTS TO THE CLAIMS:**

The following listing of claims will replace all prior versions and listings of claims in the application.

- 1. (Currently amended) A method of detecting a clonal population of cells in a biological sample, said method comprising co-localising mitochondrial DNA derived from said sample, which co-localisation is based on nucleotide sequence identity, and qualitatively and/or quantitatively detecting the levels of said co-localised mitochondrial DNA wherein a higher level of a co-localised mitochondrial DNA population relative to background levels is indicative of the presence of a clonal population of non-neoplastic cells characteristic of a leukaemia, lymphoma, myeloma, myelodysplasia, polycythaemia vera or a myeloproliferative syndrome.
- 2. (Currently amended) A method for diagnosing and/or monitoring a clonal population of non-neoplastic cells in a mammal, said method comprising co-localising mitochondrial DNA derived from a biological sample derived from said mammal, which co-localisation is based on nucleotide sequence identity, and qualitatively and/or quantitatively detecting the levels of said co-localised mitochondrial DNA wherein a higher level of a co-localised mitochondrial DNA population relative to background levels is indicative of the presence of a clonal population of non-neoplastic cells characteristic of a leukaemia, lymphoma, myeloma, myelodysplasia, polycythaemia vera or a myeloproliferative syndrome.

## 3-12. (Canceled)

- 13. (Previously presented) The method according to claim 1 or 2, wherein said mitochondrial DNA is mitochondrial D loop DNA.
- 14. (Canceled)
- 15. (Previously presented) The method according to claims 1 or 2 wherein said colocalisation is achieved utilising any one of the techniques of:
  - (i) Denaturing gradient electrophoresis

- (ii) Temperature gradient denaturing electrophoresis
- (iii) Constant denaturing electrophoresis
- (iv) Single strand conformational electrophoresis
- (v) Denaturing high performance liquid chromatography
- (vi) Microassays
- (vii) Mass spectrometry
- 16. (Previously presented) The method according to claim 1 or 2 wherein said colocalisation is achieved utilising denaturing gel or capillary electrophoresis.
- 17. (Currently amended) A method for diagnosing and/or leukaemia, lymphoma, myeloma, a non-neoplastic disease condition myelodysplasia, polycythaemia vera or a myeloproliferative syndrome, said method comprising co-localising mitochondrial DNA derived from a biological sample derived from said mammal, which co-localisation is based on nucleotide sequence identity and qualitatively and/or quantitatively detecting the levels of said co-localised mitochondrial DNA wherein a higher level of the co-localised mitochondrial DNA population relative to background levels is indicative of the presence of a clonal population of non-neoplastic cells-characteristic of leukaemia, lymphoma, myeloma, myelodysplasia, polycythaemia vera or a myeloproliferative syndrome.
- 18-27. (Canceled)
- 28. (Currently amended) The method according to claim 17 or 33 or 20, wherein said mitochondrial DNA is mitochondrial D loop DNA.
- 29. (Canceled)
- 30. (Currently amended) The method according to claims 17 or 33 or 20 wherein said colocalisation is achieved utilising any one of the techniques of:
  - (i) Denaturing gradient electrophoresis.
  - (ii) Temperature gradient denaturing electrophoresis

- (iii) Constant denaturing electrophoresis
- (iv) Single strand conformational electrophoresis
- (v) Denaturing high performance liquid chromatography
- (vi) Microassays
- (vii) Mass spectrometry
- 31. (Currently amended) The method according to claim 17 or 33 or 20 wherein said colocalisation is achieved utilising denaturing gel or capillary electrophoresis.
- 32. (New) The method according to claim 1 or 2 wherein said non-neoplastic of cells correspond to a myleodysplasia, polycythacemia vera or a myeloproliferative syndrome.
- 33. (New) The method according to claim 17 wherein said disease condition is myelodysplasia, polycythaemia vera or a myeloproliferative syndrome.